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(54) LIQUID APPLYING APPARATUS AND METHOD FOR MAINTAINING LIQUID APPLYING APPARATUS

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CPC **B41J 2/17566** (2013.01)

(56) References Cited

U.S. PATENT DOCUMENTS

| 7,537,661 | B2 | 5/2009 | Nakag | awa et al. | |
|-----------|------|--------|-------|------------|------------|
| 8,696,080 | B2 * | 4/2014 | Cerro | | B41J 2/175 |
| | | | | | 347/7 |

8,931,881 B1 1/2015 Sunaoshi 2013/0286061 A1 10/2013 Nakamura 2015/0224775 A1 8/2015 Matsumoto

FOREIGN PATENT DOCUMENTS

| EP | 1004451 | 5/2000 |
|----|-------------|---------|
| EP | 2 732 974 | 1/2016 |
| JP | 2007-044647 | 2/2007 |
| JP | 2011-201234 | 10/2011 |
| JP | 2014-100805 | 6/2014 |
| JP | 2015-006766 | 1/2015 |

OTHER PUBLICATIONS

Extended European Search Report dated Nov. 11, 2016.

* cited by examiner

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(57) ABSTRACT

A liquid applying apparatus includes a feeding container; first and second liquid-supply containers for supplying a liquid to the feeding container; a switch for switching a supply source between the first and second liquid-supply containers; a first storage for storing a supply start time of a supply operation; a second storage for storing supply information including a supply source or a supply route; a third storage for storing a liquid level in the feeding container at the supply start time; a fourth storage for storing a supply operation time of the supply operation; a controller that determines a condition of the liquid applying apparatus based on the supply operation time, and determines the supply source or the supply route as an inspection-required spot based on the supply information when the liquid applying apparatus is in a potentially-abnormal condition; and a fifth storage for storing the inspection-required spot.

12 Claims, 9 Drawing Sheets



